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EXAMINER

KUNAMNENI, HARI P

ART UNIT	PAPER NUMBER
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2153

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/766,164

Applicant(s)

ANSARI ET AL.

Examiner

Hari P. Kunamneni

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on January 28, 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date June 27, 2005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED OFFICE ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 6 and 7 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 6, lines 1-3, state that, "... suspending transmission of packets to the non-migrator at the transport layer suspends packet transmission during a race condition with firewall-filtering rules".

The claim is confusing. The claim does not state how firewall filtering rules related to packet transmission, how this will cause a race condition. However, on page 10, second Para, states, that non-smooth migration process causes race conditions that may generate TCP reset messages. By logical conclusion, that will terminate the TCP connection to non-migrator. For examination of claim 6, examiner has assumed that non-migrator will stop generating tcp reset messages by use of firewall rule(s).

Claim 7 is also rejected, because claim 7 is dependant upon the claim 6.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-5, 8-14, and 16-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Funato et al. ("TCP-R: TCP Mobility Support for Continuous operation", NETWORK PROTOCOLS, 1997).

For claim 1 and 21:

A method of migrating from a current endpoint address to a new endpoint address by a migrator (See Page 232, Fig. 2, MH) during a session between the migrator and a non-migrator (See Page 232, FIG. 2, CH) in a packet-based communication system, the method comprising the steps of:

(a) changing, in the migrator, the current endpoint address to the new endpoint address (mobile host changes its end point address; see page 233, first column, second Para, last line, "... the MH also revises its own pair of addresses");

(b) suspending transmission to the non-migrator of packets with the new endpoint address (Disconnect with CH and maintaining the TCP/IP connection means suspension of connection, See Figure 2 (shown above), disconnect between CH and MH under the dotted line);

(c) informing the non-migrator of the change to the new endpoint address (redirect message is notifying change of address, see page 232, second column, second Para from bottom, last line, "After the MH obtains a new IP address, the MH sends a redirect message to its correspondent host(CH).") ;

(d) resuming transmission to the non-migrator of packets with the new endpoint address (Resumed to communicate with revise TCP connection is resumption of transmission; see page 233, first column, third Para from top, "They [MH and CH] resume to communicate with the revised TCP connection").

For claim 2:

The invention of claim 1 (see supra for claim 1 discussion), wherein step (a) comprises the steps of logically changing to the new endpoint address and updating a kernel structure of the migrator (For TCP-R to work correctly, both migratory and non-migrator end point address needed to be updated. See page 235, first column, first Para, lines 2 , "... it changes dstaddr in its 4-tuple [another implied tuple representing tcp, total five tuples], ... these operations are needed by both ends [i.e. both migratory and non-migrator] of the connection.")

For claim 3:

The invention of claim 2 (See supra for discussion claim 2), wherein the migrator changes to the new current address by changing from a current 5-tuple comprising the current endpoint address to a new 5-tuple comprising the new endpoint address (The TCP address is identified by five tuples, Protocol, TCP (implied in the implementation), Source address, source port, destination address (dstaddr), and destination port (dstport), see page 234, second column, last para, lines 2-3, "TCP connections are identified by a 4-tuple of {srcaddr, srcport, dstaddr, dstport}"), and updating the kernel structure of the migrator comprises modifying a socket with the current 5-tuple to reflect the new 5-tuple, the socket being associated with the session (Changing the destination address and rehashing hash entry is updating the kernel structure and if socket address is not updated, TCP-R will not function, see Page 235, first Para, lines , "When a redirection segment arrives to a host which supports TCP-R, it changes destaddr in its 4-tuple and rehashes the hash entry related to its correspondent host. To achieve the redirect operation correctly, these operations are needed by both ends of the connection.").

For claim 4:

The invention of claim 2 (see supra claim 2 discussion), wherein step (a) comprises the steps of registering with the non-migrator (revising pair of addresses is the registration of address, See page 233, second Para from top, lines 2-3 "CH revises the pair of addresses of the existing TCP connection")

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before initiating the change to the new endpoint address (sending the redirect message is initiating change to the new end point address, See page 232, second Para from bottom, last tow lines, "... MH sends a redirect message to its correspondent host (CH)".

For claim 5:

The invention of claim 1 (see supra for claim 1 discussion), wherein step (b) comprises the steps of dropping packets from the non-migrator received at the network layer and suspending transmission of packets to the non-migrator at the transport layer (When tcp connection between MH and CH are disconnected, the network layer will drop any packets addressed to the CH; while maintaining the tcp/ip connection, if tcp connection is disconnected and resumed between CH and MH, it is equivalent to suspending, see page 232, Figure 2, for disconnect MH and CH and see page 233, column 1, Para 3 from top, first line, "They resume to communicate with revised TCP connection).

For claim 6:

The invention of claim 5, wherein the step of suspending transmission of packets to the non-migrator at the transport layer (since mobile host (migratory) has disconnected while maintaining TCP connection, the migratory must have stopped sending the packets; see Page 232, Figure 2) suspends packet

transmission during a race condition with firewall-filtering rules.

For claim 8:

The invention of claim 1 (See supra for claim 1 discussion), wherein step (c) comprises the steps of sending a control message to the non-migrator informing the non-migrator of the change to the new endpoint address (sending redirect message is notifying change of end point address; see page 232, second column, second Para from bottom, last line, "MH sends a redirect message to its correspondent host (CH)") and receiving a confirmation from the non-migrator that the non-migrator has changed to the new endpoint address (Receiving AT_REQ in rd_snt state by migrator is equivalent to receiving confirmation that non-migrator has changed the end point address; See Page 233, section 4.3 details of RD-SNT, "After RD-REQ is sent to the mobile host side, the mobile host [migratory] enters the RD_SENT state ... When the mobile host [migrator] receives the authentication segment (AT_REQ) in this state, it sends a calculated identifier to the peer. Then it [migrator] to the established state" and RD_RCVD, "When the correspondent host [non-migrator] RD_REQ, it [non-migrator] enters the RD_RCVD state. ... it [non-migrator] just sends an AT_REQ segment and enters ESTAB state.";).

For claim 9:

The invention of claim 1 (see supra for claim 1 discussion), wherein, for steps (a) through (d), the session conforms to a transmission control protocol and an Interact protocol (TCP redirection is an extension to TCP/IP and therefore conforms to the TCP/IP; See abstract, first line, "The TCP-R (TCP redirection) is an extension of the TCP ...").

For claim 10:

The invention of claim 1 (see supra for claim 1 discussion), wherein the method is implemented in a processor of a node in a packet network (MH is a portable computer implementing claim 1 and further described as frequently changing IP address, therefore, MH is processor implemented in a single node; see Page 229, section 1, introduction, first Para, lines 6-8, "so they [portable computers] may change IP addresses when the ..") .

For claim 11:

The invention of claim 10 (see supra for claim 10 discussion), wherein, for step (d), the session comprises packets exchanged between the migrator and non-migrator in at least one of a wired communication network (10BaseT Ethernet is a wired communication; see Page 235, second column, Section 5.5, first Para, line 7, "10BaseT Ethernet is used as the data link layer.") and a wireless communication network (When the machines are moved between the cells, they are in wireless communication network, See page 229, first column,

section 1 introduction, lines 6-8, "so they may frequently change IP addresses when the machines are moved between cells.").

For claim 12 and 22:

A method of migrating from a current endpoint address to a new endpoint address by a non-migrator (See Page 232, Figure 2, CH is non-migrator) during a session between the non-migrator and a migrator (See Page 232, Figure 2, MH is migrator) in a packet-based communication network (CP implies packet based network, see abstract, first line, "The TCP-R (TCP Redirection) is an extension of TCP ..."), the method comprising the steps of:

(a) receiving a control message indicating the migrator's change to the new endpoint address (See MH sending the redirect message is control message, see page 232, second column, second Para, from the bottom, last line "... MH sends a redirect message to its correspondent host(CH).");

(b) changing, in the non-migrator, the current endpoint address to the new endpoint address (see page 233, first column, second Para, line 2, "... CH revises the pair of addresses ...");

(c) acknowledging, to the migrator, the non-migrator's change to the new endpoint address (Receiving AT_REQ in rd_snt state by migrator is equivalent to receiving acknowledgment that non-migrator has changed the end point address; See Page 233, section 4.3 details of RD-SNT, "After RD-REQ is sent to the

mobile host side, the mobile host [migratory] enters the RD_SENT state ... When the mobile host [migrator] receives the authentication segment (AT_REQ) in this state, it sends a calculated identifier to the peer. Then it [migrator] to the established state" and RD_RCVD, "When the correspondent host [non-migrator] RD_REQ, it [non-migrator] enters the RD_RCVD state. ... it [non-migrator] just sends an AT_REQ segment and enters ESTAB state."); ; and

(d) exchanging, with the migrator, packets of the session with the new endpoint address (Resuming communication, is exchange of packets, See page 233, first column, third Para, first line, "They [MH and CH] resume to communicate with the revised TCP connection.").

For claim 13:

The invention of claim 12 (see supra for claim 12 discussion), wherein step (b) comprises the steps of logically changing to the new endpoint address and updating a kernel structure of the non- migratory (For TCP-R to work correctly, both migratory and non-migrator end point address needed to be updated. See page 235, first column, first Para, lines 2 , "... it changes dstaddr in its 4-tupel [another implied tuple representing tcp, total five tuples], ... these operations are needed by both ends [i.e. both migratory and non-migrator] of the connection.").

For claim 14:

The invention of claim 13 (see supra claim 13 for discussion), wherein the non-migrator changes to the new current address by changing from a current 5-tuple comprising the current endpoint address to a new 5-tuple comprising the new endpoint address (The TCP address is identified by five tuples, Protocol, TCP (implied in the implementation), Source address, source port, destination address (dstaddr), and destination port (dstport), see page 234, second column, last para, lines 2-3, "TCP connections are identified by a 4-tuple of {srcaddr, srcport, dstaddr, dstport}") and updating the kernel structure of the non-migrator comprises modifying a socket with the current 5-tuple to reflect the new 5-tuple, the socket being associated with the session (Changing the destination address and rehashing hash entry is updating the kernel structure and if socket address is not updated, TCP-R will not function, see Page 235, first Para, lines , "When a redirection segment arrives to a host which supports TCP-R, it changes destaddr in its 4-tuple and rehashes the hash entry related to its correspondent host. To achieve the redirect operation correctly, these operations are needed by both ends of the connection.").

For claim 15:

The invention of claim 13 (see supra for claim 13 discussion), wherein step (a) comprises the steps of:

registering the migrator before receiving the control message (to detect change in IP address by an external daemon requires registration of change of

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address with daemon; see page 231, second column, first Para from bottom, first line, "... TCP-R assumes that each mobile host can detect the change of its IP address some how. ... external daemons may be required for this assumption".

For claim 16:

The invention of claim 12, wherein step (b) includes the step of continuing to receive packets from the migrator during the change (Since Disconnect while maintaining TCP connection is equivalent to suspension, and before resuming the connection the packets of RD-REQ, AT-REQ, and AT_REP are exchanged between CP and MH, packets are exchanged between CH and MH, See page 232, Figure 2 in conjunction with Page 233, Section 4.3).

For claim 17:

The invention of claim 12, wherein, for step (d), the session conforms to a transmission control protocol and an Internet protocol (TCP extensions conform to TCP/IP, see Page 229, Abstract, first line, "The TCP-R (TCP Redirection) is an extension of TCP ...").

For claim 18:

The invention of claim 12, wherein the method is implemented in a processor of a node in a packet network (see Page 235, second column, section

5.5, first Para, lines 5-7, "... IBM PC/AT Compatibles (Pentium 166 MHz, Free BSD) as CH ...").

For claim 19:

The invention of claim 18, wherein, for step (d), the session comprises packets exchanged between the migrator and non-migrator in at least one of a wired communication network (10BaseT Ethernet is a wired communication; see Page 235, second column, Section 5.5, first Para, line 7, "10BaseT Ethernet is used as the data link layer.") and wireless communication network (When the machines are moved between the cells, they are in wireless communication network, See page 229, first column, section 1 introduction, lines 6-8, "so they may frequently change IP addresses when the machines are moved between cells.").

For claim 20:

A network comprising:

a migrator adapted to migrate from a current endpoint address to a new endpoint address during a session; and

a non-migrator adapted to migrate from a current endpoint address to a new endpoint address during a session, wherein the migrator is adapted to:

i) change, in the migrator, the current endpoint address to the new endpoint address (mobile host (migrator) changes its end point address,

see page 233, first column, second Para, last line, "... the MH also revises its own pair of addresses"),

ii) suspend transmission to the non-migrator of packets with the new endpoint address (Disconnect with CH and maintaining the TCP/IP connection means suspension of connection, See Figure 2 (shown above), disconnect between CH and MH before the dotted line),

(iii) inform the non-migrator of the change to the new endpoint address (redirect message is notifying change of address, see page 232, second column, second Para from bottom, last line, "After the MH obtains a new IP address, the MH sends a redirect message to its correspondent host(CH).") , and

iv) resume transmission to the non-migrator of packets with the new endpoint address(Resumed to communicate with revise TCP connection is resumption of transmission, See page 233, first column, third para from top, "They [MH and CH] resume to communicate with the revised TCP connection") , and

wherein the non-migrator is adapted to:

i) receiving a control message indicating the migrator's change to the new endpoint address (See MH sending the redirect message is control message, see page 232, second column, second Para, from the bottom, last line "... MH sends a redirect message to its correspondent host(CH)."),

ii) change, in the non-migrator, the current endpoint address to the new endpoint address (see page 233, first column, second Para, line 2, "... CH revises the pair of addresses ..."),

(iii) acknowledge, to the migrator, the non-migrator's change to the new endpoint address (Receiving AT_REQ in rd_snt state by migrator is equivalent to receiving acknowledgment that non-migrator has changed the end point address; See Page 233, section 4.3 details of RD-SNT, "After RD-REQ is sent to the mobile host side, the mobile host [migratory] enters the RD_SENT state ... When the mobile host [migrator] receives the authentication segment (AT_REQ) in this state; it sends a calculated identifier to the peer. Then it [migrator] to the established state" and RD_RCVD, "When the correspondent host [non-migrator] RD_REQ, it [non-migrator] enters the RD_RCVD state. ... it [non-migrator] just sends an AT_REQ segment and enters ESTAB state.");), and

(iv) exchange with the migrator, packets of the session with the new endpoint address (Resuming communication, is exchange of packets, See page 233, first column, third Para, first line, "They [MH and CH] resume to communicate with the revised TCP connection.").

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funato et al. in view of Westphal (US 2004/0202160).

For claim 7 Funato et al. teaches everything except (see supra claim 6 discussion) except dynamically adding and withdrawing firewall rules.

The general concept of updating (adding or withdrawing) firewall rules is well known in the art as illustrated by Westphal (see Page 4, Para 38, lines 4-5, "... firewall rules can be update[d] i[a]s necessary.")

It would have been obvious to one in skilled in the art at the time of the invention to modify Funato et al. to update the firewall rules in order to be able to communicate through firewall after end point address update as taught by Westphal (updating the firewall rules was necessary because of change in end-point address, which is implicit benefit in the reference teaching).


CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hari P. Kunamneni whose telephone number is (571) 274-1592. The examiner can normally be reached on Monday thru Friday 8:00-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenton B. Burgess can be reached on (571) 272-3949. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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